

What is claimed is:

1. A method of enhancing repair of a cartilage comprising the step of administering to a subject an effective amount of a cell which expresses at least one factor of the T-box family, thereby enhancing repair of the cartilage.
2. The method of claim 1, wherein said cell is a mesenchymal stem cell, a progenitor cell, a cell is capable to differentiate into a chondrocyte a fibroblast or a synovial cell.
3. The method of claim 1, wherein said factor of the T-box is brachyury.
4. The method of claim 1, wherein said cell further expresses factor which upregulates the expression of the T-box transcription factor .
5. The method of claim 4, wherein said factor which upregulates the expression of the factor of the T-box is FGF or BMP2.
6. A method of inducing formation of a cartilage comprising the step of administering to a subject an effective amount of a cell which expresses at least one factor of the T-box family, thereby inducing formation of the cartilage.
7. The method of claim 6, wherein said cell is a mesenchymal stem cell, a progenitor cell, a cell is capable to differentiate into a chondrocyte a fibroblast or a synovial cell.
8. The method of claim 6, wherein said factor of the T-box is brachyury.
9. The method of claim 6, wherein said cell further expresses factor which upregulates the expression of the T-box transcription factor .
10. The method of claim 9, wherein said factor which upregulates the expression of the factor of the T-box is FGF or BMP2.

11. A method of enhancing repair of a cartilage in the body comprising the step of administering a recombinant vector which comprises a nucleic acid encoding a factor of the T-box family to the cartilage of a subject, thereby enhancing repair of the cartilage.

12. The method of claim 11, wherein said factor of the T-box is brachyury.

13. The method of claim 11, wherein said method further comprises administering a recombinant vector which comprises a nucleic acid encoding a factor which upregulates the expression of the T-box transcription factor .

14. The method of claim 13, wherein said factor which upregulates the expression of the factor of the T-box is FGF or BMP2.

15. A method of inducing formation of a cartilage in the body comprising the step of administering a recombinant vector which comprises a nucleic acid encoding a factor of the T-box family to the cartilage of a subject, thereby inducing formation of the cartilage.

16. The method of claim 15, wherein said factor of the T-box is brachyury.

17. The method of claim 15, wherein said method further comprises administering a recombinant vector which comprises a nucleic acid encoding a factor which upregulates the expression of the T-box transcription factor .

18. The method of claim 17, wherein said factor which upregulates the expression of the factor of the T-box is FGF or BMP2.

19. A method of inducing chondrocyte differentiation comprising the step of administering of a recombinant vector which comprises a nucleic acid encoding a factor of the T-box family, thereby inducing chondrocyte formation.

20. The method of claim 19, wherein said factor of the T-box is brachyury.

21. The method of claim 19, wherein said method further comprises administering a recombinant vector which comprises a nucleic acid encoding a factor which upregulates the expression of the T-box transcription factor .
22. The method of claim 19, wherein said factor which upregulates the expression of the factor of the T-box is FGF or BMP2.
23. A method of repairing or forming a cartilage in a subject in need comprising the steps of:
- obtaining a cell from of the subject;
  - transfecting said cell with a recombinant vector comprising a nucleic acid sequence encoding a factor of the T-box family, so as to obtain an engineered cell which expresses a factor of the T-box family; and
  - administering said engineered cell to the subject.
24. The method of claim 23, wherein said cell is a mesenchymal stem cell, a progenitor cell, a cell is capable to differentiate into a chondrocyte a fibroblast or a synovial cell.
25. The method of claim 23, wherein said factor of the T-box is brachyury.
26. The method of claim 23, wherein said cell further expresses factor which upregulates the expression of the T-box transcription factor .
27. The method of claim 26, wherein said factor which upregulates the expression of the factor of the T-box is FGF or BMP2.
28. The method of claim 23, wherein said method further comprises administering a recombinant vector which comprises a nucleic acid encoding a factor which upregulates the expression of the T-box transcription factor .
29. The method of claim 28, wherein said factor which upregulates the expression of the factor of the T-box is FGF or BMP2.

30. A method for the production of transplantable cartilage matrix, the method comprising the steps of:

obtaining a cell ;

transfecting said cell with a recombinant vector comprising a nucleic acid sequence encoding a factor of the T-box family, so as to obtain an engineered cell which expresses a factor of the T-box family; and

culturing said cell with the cell-associated matrix for a time effective for allowing formation of a transplantable cartilage matrix.

31. The method of claim 30, wherein said cell is a mesenchymal stem cell, a progenitor cell, a cell is capable to differentiate into a chondrocyte a fibroblast or a synovial cell.

32. The method of claim 30, wherein said factor of the T-box is brachyury.

33. The method of claim 30, wherein said cell further expresses factor which upregulates the expression of the T-box transcription factor .

34. The method of claim 33, wherein said factor which upregulates the expression of the factor of the T-box is FGF or BMP2.

35. The method of claim 30, wherein said method further comprises administering a recombinant vector which comprises a nucleic acid encoding a factor which upregulates the expression of the T-box transcription factor .

36. The method of claim 35, wherein said factor which upregulates the expression of the factor of the T-box is FGF or BMP2.

37. An engineered cell which expresses a factor of the T-box family.

38. The cell of claim 37, wherein said cell is a mesenchymal stem cell, a progenitor cell, a cell is capable to differentiate into a chondrocyte a fibroblast or a synovial cell.

39. The cell of claim 37, wherein said factor of the T-box is brachyury.
40. The cell of claim 37, wherein said cell further expresses factor which upregulates the expression of the T-box transcription factor .
41. The cell of claim 40, wherein said factor which upregulates the expression of the factor of the T-box is FGF or BMP2.
42. A composition comprising an engineered cell which expresses a factor of the T-box family and a pharmaceutically acceptable carrier.
43. The composition of claim 42, wherein said cell is a mesenchymal stem cell, a progenitor cell, a cell is capable to differentiate into a chondrocyte a fibroblast or a synovial cell.
44. The composition of claim 42, wherein said factor of the T-box is brachyury.
45. The composition of claim 42, wherein said cell further expresses factor which upregulates the expression of the T-box transcription factor .
46. The composition of claim 45, wherein said factor which upregulates the expression of the factor of the T-box is FGF or BMP2.
47. The composition of claim 45, wherein said composition is a pharmaceutically composition.
48. A composition comprising at least one recombinant vector which comprises a nucleic acid sequence encoding at least one factor of the T-box family and a pharmaceutically acceptable carrier.

49. The composition of claim 48, wherein said composition is a pharmaceutically composition.
50. The composition of claim 48, wherein said factor of the T-box is brachyury.
51. The composition of claim 48, wherein said method further comprises administering a recombinant vector which comprises a nucleic acid encoding a factor which upregulates the expression of the T-box transcription factor .
52. The composition of claim 51, wherein said factor which upregulates the expression of the factor of the T-box is FGF or BMP2.
53. An implant device comprising at least one engineered cell which expresses a factor of the T-box family and a pharmaceutically acceptable carrier.
54. The device of claim 53, wherein said cell is a mesenchymal stem cell, a progenitor cell, a cell is capable to differentiate into a chondrocyte a fibroblast or a synovial cell.
55. The method of claim 53, wherein said factor of the T-box is brachyury.
56. The method of claim 53, wherein said cell further expresses factor which upregulates the expression of the T-box transcription factor .
57. The method of claim 56, wherein said factor which upregulates the expression of the factor of the T-box is FGF or BMP2.
58. A method of suppressing cartilage formation, comprising the step of administering to a subject in need an antagonist to a factor of the T-box family thereby suppressing cartilage formation.
59. The method of claim 58, wherein said antagonist is an antibody, an antisense, a protein, a nucleic acid or a carbohydrate.

60. The method of claim 58, wherein said antagonist is a dominant negative factor of the T-box family.

61. The method of claim 60, wherein said antagonist is a dominant negative Brachyury.

62. A method of screening candidate nucleic acid sequence which is involved in the early stages of cartilage development, said methods comprising the step of :  
obtaining a cell;

transfecting said cell with a vector comprising a nucleic acid sequence encoding to FGFR3;

obtaining mRNA from said cell;

synthesizing cDNA from said mRNA;

amplifying said cDNA-hybrid, so as to obtain an amplified product;

detecting said amplified product; and

comparing said amplified products from said sample to amplified products derived from known samples thereby identifying candidate nucleic acid sequence which is involved in the early stages of cartilage development.

63. The cell of claim 62, wherein said cell is a mesenchymal stem cell, a progenitor cell, a cell is capable to differentiate into a chondrocyte a fibroblast or a synovial cell.